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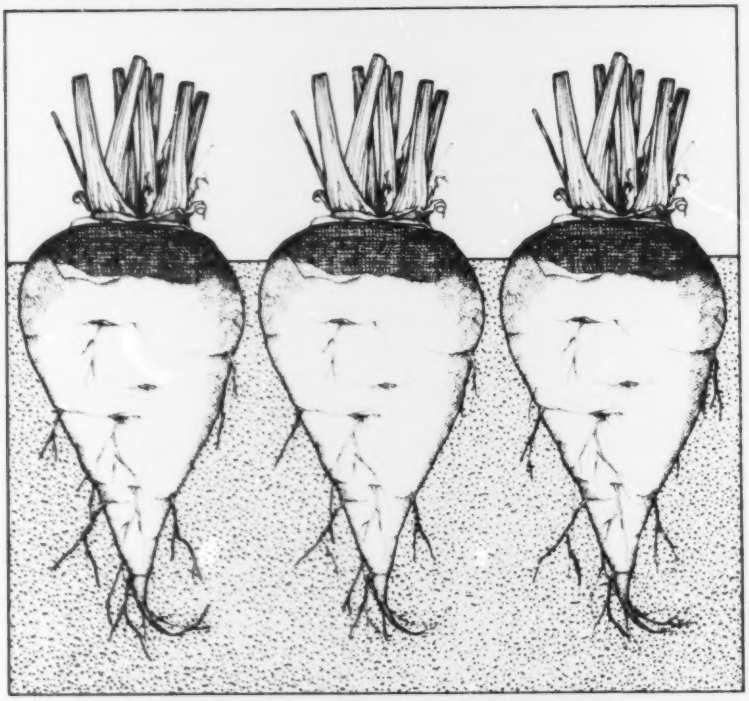

SUGAR BEET PRODUCTION — 1983

Alberta
AGRICULTURE
Production and Resource
Economics Branch

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THE ECONOMICS

OF

SUGAR BEET PRODUCTION

IN ALBERTA

1983

BY

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FOREWORD

Sugar beet is one of the most important crops grown on irrigated farms in southern Alberta. This crop occupies only 15 per cent of the seeded acreage on irrigated farms, yet contributes more than one-third of the total farm cash receipts. Given its importance, and because of grower concern for declining world sugar cane prices, the Alberta Sugar Beet Growers' Association asked the Production & Resource Economics Branch to undertake a three-year study of the economics of sugar beet production in Alberta.

Gross returns in 1983 fell by 15 per cent compared to 1981. Total production cost also fell by three per cent, but the drop was not great enough to prevent losses. Indeed, as the three-year study has shown, growers experienced increasing losses in each of the three years under study. The 1983 losses of $173 per acre were almost three times as great as those of 1981. Considering the importance of sugar beet as a cash crop on irrigated farms, the results of the study clearly point to severe financial difficulties for sugar beet growers.

DR. CARLYLE ROSS, BRANCH HEAD
PRODUCTION & RESOURCE ECONOMICS BRANCH

ACKNOWLEDGEMENTS

We wish to express our sincere thanks to the Alberta Sugar Beet Growers' Association for their cooperation during the course of this study. Also, we express our appreciation to the sugar beet growers for their cooperation in supplying us with the basic data.

Special acknowledgement is due to Mr. Ian Wood for his assistance in visiting the growers to familiarize them with the study and questionnaire and for obtaining the necessary information required for the completion of this report. The Statistics Branch of Alberta Agriculture was very helpful in selecting a sample of growers for the study.

Finally, thanks are due to the staff of the Production and Resource Economics Branch for their assistance in the preparation of this report.

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SECTION I

INTRODUCTION

The survey regarding costs and returns for sugar beet production in southern Alberta was initiated in the spring of 1981 by the Production and Resource Economics Branch (P.R.E.B.) of the Alberta Department of Agriculture. At that time, the President of the Alberta Sugar Beet Growers' Association (A.S.B.G.A.) approached the P.R.E.B. and requested that an economic study of sugar beet production be undertaken. As the past twelve years have demonstrated, production costs have been rising sharply and with the final price for sugar beets ranging from $33.44* per tonne in 1976 to $74.05 per tonne in 1979, sugar beet growers are most interested in knowing their actual financial performance.

In keeping with this request, the P.R.E.B. proceeded to conduct a study of three production years with 1981 being the initial study year. To ensure accurate interpretation and recording of the costs and returns associated with sugar beet production, it was necessary to monitor the sugar beet growers individually. This was made possible through the assistance of the Alberta Sugar Company who provided a 1980 list of sugar beet grower contracts from which a total of 51 sugar beet growers were selected and used for the 1981 study year. A report summarizing the 1981 findings of this study was published in June 1983.

A second survey of the 1982 production year was undertaken with 50 of the sugar beet growers participating. Like the previous survey, participants provided detailed information regarding their 1982 sugar beet crop and this formed the basis of a summary report that was published in June, 1984.

As initially agreed, the duration of this project would be three production (crop) years. As such, a study of the 1983 production year was done during the 1983-84 winter for which 48 of the original 51 farms provided costs/returns data for their farms and thus formed the basis of this final report.

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*Price includes government subsidy

Objectives

The primary objective of this report is to provide the A.S.B.G.A., sugar beet growers, sugar refiners, extension personnel and the general public with factual cost of production information. It covers the third and final study year (1983) and reflects an average year of production in terms of yield per acre. This report was undertaken to:

1. Determine and document the production costs and returns associated with sugar beets;
2. Determine the physical input/output relationships in the production of sugar beets;
3. Assist sugar beet growers with farm budgeting and planning;
4. Show how variation in size of operation affects net returns;
5. Observe differences in the costs and returns for sugar beet production by location;
6. Study the effect of management practices on net returns;
7. To provide each participant with accurate and detailed costs and returns information regarding his sugar beet enterprise. Group averages were also provided to allow for comparison.
8. Provide an updated economic report on sugar beet production to assist in government policy formulation.

Study Sample and Survey Method

Sugar beet growers were randomly selected from a 1980 list of grower contracts provided by the Alberta Sugar Company. The study sample selected from the various sugar beet areas was directly proportional to the total number of sugar beet growers in those areas. Forty-eight of the 51 sugar beet growers initially selected for study were able to provide costs and returns data relative to the 1983 crop year for a complete economic analysis. As observed, most study participants held more than one sugar beet contract but chose to study only one. In 1983, the 48 contracts studied represented 7.8 per cent of the total sugar beet acreage in Southern Alberta.

Initially, each participant selected for the three-year study was personally contacted during the early summer of 1981. The content of the sugar beet questionnaire was fully explained with the major emphasis placed

upon how he should relate his daily record keeping system to the information upon how he should relate his daily record keeping system to the information required for analysis. Since the same participants were retained for each of the three study years, only one visit during the winter following each harvest was required for questionnaire completion. Completed questionnaires were then analyzed by a computer program developed by the Systems Design Branch of Alberta Agriculture.

Sugar Beet Production in Alberta

Canadian Sugar Factories Ltd. began refining sugar in 1925 when they purchased a refinery built in 1903 by the Knight family. The factory was known as the Knight Sugar Factory and was located at Raymond. A second factory was constructed at Picture Butte in 1935 and was in operation until the end of the 1977 campaign. The throughput of the Picture Butte factory during the last year of operation was 2,283 tonnes per day. A third factory was built in Taber in 1950 and is the only plant in operation at present.

The factory at Taber was designed for a rated slice of 1,530 tonnes per day, but with systematic annual improvements the slicing capacity was increased to an average of 3,880 tonnes per day for the 1978, 1979, 1980 and 1981 production years. Generally, the quality of the sugar beets determines the slicing capacity. The 1980 campaign saw an initial slicing capacity of 3,840 tonnes per day due to the deterioration in the quality of sugar beets in the pile. Slicing capacity for the 1981 campaign was a record 4,200 tonnes per day, requiring 190 slicing days to process the record yielding crop of 20.39 tonnes per acre.

With the 1982 acreage contract cut by 8.0 per cent and yields below the previous five-year average, total sugar beet tonnage produced in 1982 was the second lowest within the last decade. Slicing capacity at 4,125 tonnes per day for the 1982 campaign was approximately 2.0 per cent less than that reported in 1981, and required a total of 111 slicing days to process the sugar beet crop.

Despite the acreage of sugar beets planted in 1983 being equal to that of 1982, the sugar beet tonnage produced was 20.0 per cent higher in 1983 due to a 16 per cent increase in yields. An average slicing capacity of 4,340 tonnes per day was attained for the 1983 campaign which was approximately 5.2 per cent greater than that reported in 1982. A total of 121 slicing days were required for the 1983 crop.

The Agricultural Stabilization Board established a floor price for sugar beets in 1958 and since then deficiency payments have been paid for 15 years, ranging from $0.89 per tonne to $10.06 per tonne. The last deficiency payment of $10.06 per tonne was made for the 1982 crop when total price including the subsidy was $55.57 per tonne. A summary of sugar beet production in Alberta during the past twelve years is given in Table 1.

Table 1

STATISTICAL DATA ON SUGAR BEET PRODUCTION IN ALBERTA[1]
1971-1982

Year	Contracted Acres	Harvested Acres	Total[3] Tonnage	Yield/[2] Harvested Acre	Price/ Tonne
1972	46,014	43,325	596,400	13.77	21.20
1973	43,018	38,204	526,466	13.78	51.81
1974	38,726	34,917	476,757	13.65	56.47
1975	45,986	39,535	443,066	11.21	40.02*
1976	44,186	41,190	702,267	17.05	33.44*
1977	35,464	34,607	543,718	15.71	35.36
1978	33,559	31,742	476,441	15.01	37.98
1979	33,793	31,794	499,734	15.72	74.05
1980	35,609	33,771	524,251	15.52	66.99*
1981	35,405	35,071	715,082	20.39	47.87*
1982	32,161	30,502	474,866	15.57	55.57
1983	32,354	31,563	569,846	18.05	38.76

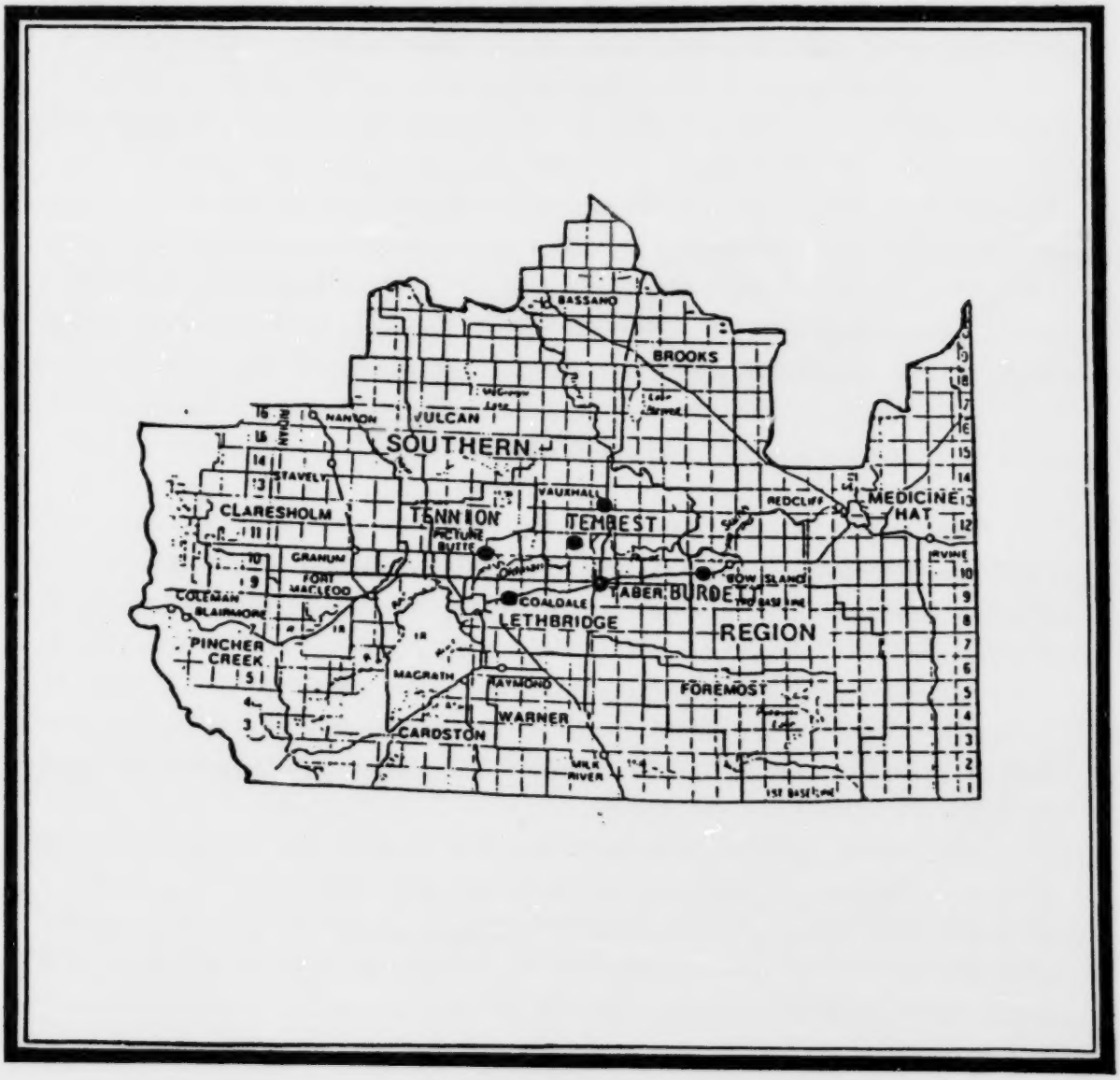
1/ 59 Annual Report (1983), Alberta Sugar Beet Growers' Association; Lethbridge, Alberta.

2/ Tonnes per acre.

3/ Tonnes.

* Price includes Government subsidy.

FIGURE 1



SOUTHERN REGION

MAP OF SOUTHERN ALBERTA SHOWING THE LOADING STATIONS
AS USED FOR 1983 SUGAR BEET HARVEST

Description of Farms

Average farming experience for the 48 study participants was 18.90 years. Similar to what was observed in the previous surveys, many of the sugar beet participants had a wide variety of other crops such as peas, corn, beans, wheat, etc. This wide diversity in crop type is a very common practice associated with irrigation farming especially in southern Alberta.

The typical farm on study had an average acreage of 534.2 acres of which approximately 76.0 per cent or 406.2 acres was seeded. The remaining 24.0 per cent or 128.0 acres consisted of summerfallow and unseeded land. As indicated, the total acreage seeded to sugar beets for the average farm was very small and represented only 17.6 per cent or 71.5 acres of the total cultivated acres. Despite its relatively small size, sales from sugar beet production usually account for more than a third of the total farm income received for the average farm studied.

Growing Conditions

Sugar beet growers harvested an above average crop in 1983 despite the problems encountered with the early May frost, July hail storms, and insects. Yields in 1983 averaged 18.05 tonnes per acre as compared to 15.57 in 1982 and 20.39 in 1981. The overall average yield for the three study years was 18.00 tonnes per acre. The most severe problem occurred on May 12 when a frost caused a replanting of forty-one per cent of the entire beet acreage. Further yield reduction occurred in July as rain storms and hail affected approximately 3,800 acres.

A secondary problem experienced by the growers was the incidence of insects. Control of this problem could be met with a broad spectrum of chemicals available. The flea-beetle, cutworm, and sugar beet root maggot were the most prominent and had varying degrees of negative effect on the yield depending on the type of field infested.

Method of Analysis

The reader should be aware that all of the information presented with respect to the various costs and returns are based on planted acres. Costs as shown in the summary tables are expressed on a "per acre basis" and are

the result of dividing the sum of all expenses by the total planted acres. For some specific cases certain cost items were not incurred in an individual operation and were accounted for in the method used in the determination of cost on a per acre or a per tonne sold basis. For the reader's benefit an attempt has been made to explain and elaborate on a few of the terms as used within this report.

Returns: This represents the income that was received from the sugar beet crop. Returns were from three major sources, namely:

1. Actual sugar beet sales;
2. Hauling allowances received;
3. Sale of sugar beet tops.

At the time of data analysis, an estimated price of $40.00 per tonne was used as suggested by the Alberta Sugar Company.

A value was assigned to sugar beet tops only by those study participants utilizing the same for livestock feed. This value was totally dependent on top growth. The general trend seems to suggest an increase in the use of the sugar beet defoliator whereby much of the crop residue is incorporated into the soil. The average value of sugar beet tops for the study sample was $9.20 per acre or $0.52 per tonne of sugar beets produced.

Additional income was realized by some of the study participants through the incorporation of hauling allowances. This benefit was solely dependent upon the hauling distance to the Taber factory. Presented on the next page is Table 2 showing the hauling allowance schedule for sugar beets delivered to the Taber factory. On the average, the typical study participant realized an income of $3.82 per acre or $0.21 per tonne for the total sugar beet tonnage hauled.

Labour: Only a few of the sugar beet growers were able to perform all of the necessary farming operations without the utilization of hired labour. Hired labour was predominantly used on a contractual basis for the thinning, weeding and hoeing operations. For hired labour that was not contracted the value assigned was representative of the actual amount paid. The majority of growers on study utilized hired wage labour during the harvesting operation especially for the hauling of sugar beets to the various loading stations. The average sugar beet grower studied in 1983, utilized a total of 129.01 hours of hired labour for the 51.87 acres planted. On an hourly basis, this amounted to 2.49 hours per acre with an average value of $6.12 per hour. Operator's labour was valued at $7.00 per hour.

Table 2

HAULING ALLOWANCE PAID IN 1983 FOR SUGAR BEETS
DELIVERED TO THE TABER REFINERY

Distance Miles	Hauling Allowance $ /tonne	Distance Miles	Hauling Allowance $ /tonne
0 - 5.9	FREE ZONE	18 - 18.9	1.11
6 - 6.9	0.18	19 - 19.9	1.17
7 - 7.9	0.29	20 - 20.9	1.23
8 - 8.9	0.41	21 - 21.9	1.30
9 - 9.9	0.52	22 - 22.9	1.36
10 - 10.9	0.61	23 - 23.9	1.42
11 - 11.9	0.68	24 - 24.9	1.48
12 - 12.9	0.75	25 - 25.9	1.54
13 - 13.9	0.81	26 - 26.9	1.60
14 - 14.9	0.87	27 - 27.9	1.67
15 - 15.9	0.93	28 - 28.9	1.73
16 - 16.9	0.99	29 - 29.9	1.79
17 - 17.9	1.05	over 30	1.85

Machine Costs: Each study participant was asked to provide a detailed inventory of all equipment and the total hours used in the production of the sugar beet crop. Having obtained this information, total operating and ownership costs for each machine was calculated. To facilitate computation of machinery costs and depreciation, the publication "Farm Machinery Costs - 1982, Agdex 825-12" was utilized in which detailed costs for each machine type were updated by use of indices to give 1983 hourly values. The hourly costs as presented in this publication are most current and take into account such factors as replacement costs, interest, insurance, housing, fuel, lubrication and repairs. For those operations involving custom work, no machinery costs were assigned but rather these were costed at the actual amounts paid by the sugar beet growers and are indicated in the cost table as a cash cost.

Materials: Most supplies such as seed, fertilizers, herbicides, etc., were bought through the Alberta Sugar Company and were valued at their actual cost. It should be added that some of the study participants indicated the use of barnyard manure on their sugar beet land and in such cases,

the cost of the manure was not determined but rather, the cost of manure spreading was allocated towards the 1983 sugar beet crop. It is recognized that such manure applications will have a significant effect on subsequent crop yields.

Cash Overhead: The major cash items included under the heading of cash overhead were crop insurance, association fees, land and water taxes, building and equipment insurance, utilities and miscellaneous. Since these costs are basically fixed annual charges they were recorded at the actual dollar value paid. Association fees remained unchanged from the previous study year - 1981, at fifteen cents per tonne and were deducted from the November 6, 1983 and December 6, 1983 initial payments. Included under cash overhead was interest on operating capital, in which the amount was determined by applying an interest rate of 14.0 per cent on all cash costs for a six month period.

Real Estate: The valuation of land associated with sugar beet production was done by the study participant themselves. Their basic criteria for land evaluation was the utilization of the market value of similar land in their area. Realizing an inflationary return on land of approximately 5.0 per cent, interest on land investment was calculated using 7.0 per cent. For those study participants who cash rented or crop shared land the actual cash paid or crop (valued at $38.76 per tonne) was used to reflect their land cost.

Study participants also provided a listing of all buildings and other permanent facilities such as roads, ditches, natural gas lines, etc. associated with the sugar beet operation. The age, market value and percentage of use were also given and were used in the calculation of depreciation and interest costs. The interest rate used in assessing the opportunity cost on money invested in buildings and other permanent facilities was 12.0 per cent for a six month period.

SECTION II

SUMMARY OF COSTS AND RETURNS FOR THE STUDY SAMPLE

Returns From Sugar Beet Sales

In 1983, average sugar beets sale per grower was 868.67 net tonnes which is an average of 17.87 tonnes per planted acre. The average grower on study delivered 925.73 net tonnes or an average of 17.85 tonnes per planted acre. Sugar beet production in 1983 represented an above average year as yields were 16 per cent higher than those obtained in 1982, but 11.5 per cent lower than in 1981. With sugar beet yields varying from 10.22 tonnes to 23.64 tonnes per acre, study participants experienced a considerable range in returns. Gross income resulting from the sale of sugar beets for the average sugar beet grower studied was $691.75 per acre or $38.76 per tonne. (Table 3)

Table 3

SUMMARY OF SUGAR BEET RETURNS - 1983

	$ /Acre	$ /Tonne
Sugar Beet Sales	$691.75	$38.76
Value of Sugar Beet Tops	9.20	0.52
Hauling Allowance	3.82	0.21
TOTAL ESTIMATED INCOME	$704.77	$39.49

Apart from income realized through the direct sale of sugar beets, some study participants indicated additional income from the sale of sugar beet tops that were utilized in livestock feeding. These additional returns ranged from $20.00 per acre to $50.00 per acre and averaged $38.50 per acre for the 15 farms reporting. When weighted on a total group basis, the average return from sugar beet tops amounted to $9.20 per acre or $0.52 per tonne.

Another source of income was from the hauling of sugar beets directly

to the Taber refinery providing that the distance hauled exceeded 5.9 miles. Of the 48 sugar beet farms analyzed, only 8 or 16.7 per cent received a hauling allowance. For those growers who received a hauling allowance, a wide range was noted ranging from $6.77 per acre to $30.08 per acre. When considered on a group basis, total hauling allowance amounted to $3.82 per acre or $0.21 per tonne.

Direct Cash Expenses

All of the cost information presented in this report is based on planted acres. The various costs as presented in the summary tables are not simple averages but rather are weighted and expressed on a per acre basis. The reader should be aware that for any kind of enterprise to be economically viable its returns must exceed its operating costs. Failure to achieve this will result in the failure of that enterprise. In evaluating the direct cash expenses that were associated with the sugar beet enterprise five major costs were considered, each of which is described in some detail in the following paragraphs.

Machine Operating Costs: Machine operating costs still remain to be the highest cash cost facing sugar beet growers. For example, in the 1983 study, expenditures in machinery fuel and repairs for the average sugar beet grower with 51.87 planted acres amounted to $8,634.66 or $166.46 per acre. This, when expressed as a percentage of the total cash costs accounted for 32.1 per cent.

The method used in the determination of machinery fuel and repair costs was very straight forward. It involved the application of updated hourly rates for machinery fuel and repairs (see Farm Machinery Costs - 1982, Agdex 825-12), to the total number of hours a specific machine was used in the sugar beet operation. The subsequent totals for each type of machine engaged in sugar beet production were then added and divided by the total planted acres to arrive at the average cost per acre.

A breakdown of machine operating costs for the average sugar beet grower studied during the pre-season, seeding, summer and harvesting operations is given in Table 4.

Machine operating costs for the pre-season operation included the cost of all of the farming operations performed on the land immediately after the previous crop was harvested. For sugar beets grown on previously

Table 4

BREAKDOWN OF MACHINE OPERATING COSTS
ASSOCIATED WITH SUGAR BEETS - 1982

Operation	Fuel and Repair Costs ($)	Fuel & Repair Costs per Acre ($)	Percent of Total
Pre-seeding	1,778.43	$ 34.29	20.6
Seeding	399.10	7.69	4.6
Summer	1,965.27	37.89	22.8
Harvesting	4,491.84	86.60	52.0
TOTAL	8,634.66	166.46	100.0

summerfallowed land, the cost of the summerfallow operations was included as well. The seeding operation as the name implies represented the machinery costs associated with the planting of the sugar beet crop. Machine operating costs reported for the summer operations consisted mainly of row cultivation and irrigation costs. As observed, the highest cost of machinery operation occurred during the harvesting periods. That is, harvesting costs at $86.60 per acre accounted for 52.0 per cent of the total machine operating costs. The main harvesting operations included topping/defoliating, digging, and hauling, each of which required the use of highly specialized equipment.

Material Costs: Material costs for the average contract studied totalled $153.47 per acre. When this amount was expressed as a percentage of the total cash costs it accounted for 29.6 per cent and was the second most significant cash cost. Shown in Table 5 are the average cost of the basis input comprising material costs. For the 48 sugar beet growers studied, the range in total material cost was quite large varying from a low of $69.15 to $259.17 per acre.

Hired Labour and Custom Contract Work: Another fairly significant cash cost was that of hired labour and custom/contract work. When combined, these two items totalled $83.79 per acre or represented 16.2 per cent of the total cash costs. As the previous study had indicated, high labour requirements still remain to be a major challenge facing sugar beet growers and

Table 5

SUMMARY OF MATERIAL INPUT COSTS ASSOCIATED
WITH SUGAR BEET PRODUCTION - 1983

Material Input	Frequency	Average Cost per Acre ($)	Range in Costs ($/Acre)
Seed	48	38.68	12.46 - 73.35
Fertilizers	48	72.63	40.60 - 120.80
Herbicides	44	37.38	8.03 - 94.65
Insecticides	12	4.78	7.56 - 46.88
TOTAL		153.47	

this is even compounded further by the fact that the labour demand by such an enterprise is seasonal.

In an attempt to meet this challenge a noticeable decline in hired labour use by approximately 59.1 per cent was noted for the 1983 crop as compared to 1981. That is, hired wage labour totalled 218.10 hours or 4.21 hours per acre in 1981 and 129.01 hours or 2.49 hours per acre in 1983. One possible explanation for this is that sugar beet growers are becoming more cost conscious in the face of rising labour costs and have therefore been adopting better management practices such as herbicide incorporation, mechanical thinning and space planting. As an indication as to the rate per hour charged and the distribution of the total hours used for the various sugar beet activities Table 6 has been compiled.

For the typical sugar beet grower studied, a total of $790.06 was spent for hired labour. On an acre basis this cost amounted to $15.23 per acre or $6.12 per hour..

Listed in Table 7 are the most common custom contract operations performed in 1983, their frequencies and their average cost per acre. The average study participant spent a total of $3,556.47 or $68.57 per acre for custom/contract work.

Cash Rent/Crop Share: Fifteen or 31.3 per cent of the study participants had either cash rent or crop share arrangements for the sugar beet acres under study. Whenever the total cost of the cash lease was given,

Table 6

HIRED LABOUR USE AND COST FOR SUGAR BEET PRODUCTION - 1983

Operation	Hired Labour Hours	Hourly Rate ($)	Total Costs ($)
Pre-Season	8.56	6.47	55.42
Seeding	3.38	5.99	20.25
Summer	9.88	6.76	66.77
Harvest	107.20	6.04	647.62
TOTAL	129.01	6.12	790.06

Table 7

LIST OF CUSTOM/CONTRACT OPERATIONS ASSOCIATED WITH SUGAR BEET PRODUCTION - 1983

Operation	Cost Per Acre ($)
Weeding	23.30
Thinning	38.00
Weed - Thin - Hoe	49.78
Fertilizer Spreading	2.75
Air Spraying (includes insecticide)	5.12
Manuring	36.72
Hauling Sugar Beets	3.25 - 5.00*
Custom Topping, Digging, Hauling	12.84*

*Dollars per tonne

this was interpreted as a cash cost and in many cases represented a lump sum payment for a quarter section of land. For such instances, only a fraction of this payment was allocated to the sugar beet enterprise.

Where the tenant agreed to pay the landlord a portion of the sugar beet crop, the actual cost for such a crop share arrangement was determined by valuing the landlord's tonnage at $38.76 per tonne.

The average cost for the 15 sugar beet growers with crop share/cash rent arrangements amounted to $124.90 per acre. This cost when expressed on a total group basis was $36.05 per acre.

Cash Overhead: For any given enterprise there exist "certain" cash costs that cannot be divorced from itself. These "certain" costs are what is often referred to as cash overhead costs and for the purpose of this study included crop insurance, association fees, land and water taxes, building and equipment insurance, utilities and miscellaneous. Shown in Table 8 are these costs and their corresponding totals.

As observed in 1983, only 3 or 6.3 per cent of the sugar beet growers studied exercised the option of acquiring crop insurance. For those who did, a wide variation in cost was observed ranging from $3.20 per acre to $7.57 per acre. Total crop insurance when expressed for the entire group was $15.01 or $0.29 per acre.

Association fees were paid by all of the sugar beet growers and were deducted at the time of the initial sugar beet payment. For the group studied, association fees averaged $3.57 per acre. Like association fees, land and water taxes represent fixed annual charges and were paid by all sugar beet growers owning land. Average cost per acre for land and water tax for the study group were $3.64 and $10.02, respectively. For those sugar beet growers with crop share/cash rent arrangements, no land or water tax was paid. Due to the nature of items such as building and equipment insurance and utilities which represent "lump sum" costs for the total farm, it was necessary for the study participants themselves to allocate only a portion of these cost to their sugar beet enterprises. Interest on operating capital for the 1983 study year was calculated using an interest rate of 14.0 per cent for a six month period. As a note of interest, the grower's share of beet freight charges from the loading station to the Taber factory was included in the miscellaneous overhead. In 1983, 34 study participants reported an expense for beet freight, ranging from $3.00 per acre to $9.76 per acre. The average for the study group was $3.56 per acre. Also includ-

Table 8

SUMMARY OF CASH OVERHEAD COSTS FOR THE AVERAGE SUGAR BEET GROWER - 1983

Cash Overhead	Total Cost ($)	Cost Per Acre ($)
Crop Insurance	15.01	0.29
Association Fees	185.22	3.57
Land Tax	188.87	3.64
Water Tax	519.77	10.02
Building & Equipment Insurance	454.76	8.77
Utilities	393.23	7.58
Miscellaneous Overhead	535.52	10.33
Interest on Operating Capital	1,757.31	33.88
TOTAL CASH OVERHEAD	4,049.69	78.08

ed in the miscellaneous overhead category were small tools, subscriptions, office supplies, etc.

Non-Cash Overhead: Each participant on study indicated the market value of owned land so that an opportunity cost could be calculated for sugar beets grown on such land. The land values obtained were quite variable and ranged from $1,000.00 per acre to $2,000.00 per acre. Realizing an inflationary return on land of approximately 5.0 per cent, interest on land investment (that is, opportunity cost) was calculated using 7.0 per cent. For the average sugar beet grower studied, opportunity cost associated with owned land was $3,855.01 or $74.32 per acre.

Depreciation and interest costs were determined for only those buildings and improvements that were involved with sugar beet production. Depreciation on buildings was calculated by taking a percentage of the market value that was appropriate to the sugar beet enterprise, subtracting an assumed salvage value of 10.0 per cent and dividing by the estimated number of years of useful life remaining. Under the title of buildings were included a portion of the operator's house, sugar beet labour houses, machine sheds and garages. For each of these items study participants indicated the percentage of use that would apply to the sugar beet operation.

Improvements included non-depreciable assets such as gas lines, roads and ditches for which an opportunity interest cost was determined. In 1983, the average sugar beet grower studied indicated a total market value of $17,173.84 for buildings and improvements which, when expressed on a per acre basis, amounted to $331.09.

The primary source of labour for sugar beet activities came from the operator himself. To illustrate, approximately 512.78 man hours or 79.9 per cent of the total man hours was supplied by the operator while 129.01 man hours or 20.1 per cent was hired. For the purpose of this study all of the operator's labour was valued at $7.00 per hour. On a per acre basis, operator's labour in 1983 averaged $69.20 for the 9.89 hours spent. A summary of the non-cash overhead costs associated with sugar beet production is shown in Table 9.

Table 9

SUMMARY OF NON-CASH OVERHEAD COSTS FOR SUGAR BEETS - 1983

Item	$/Acre
Operator's Labour	69.20
Machinery Interest & Depreciation	185.13
Building & Equipment Interest & Depreciation	31.26
Land Interest (7.0%)	74.32
TOTAL	359.91

Summary of Costs and Returns: Presented in Table 10 is a summary of costs and returns for the average sugar beet grower analyzed relative to the 1983 sugar beet production year.

Despite sugar beet yields being 16 per cent higher in 1983 versus 1982, sugar beet growers were in a more negative position with production costs exceeding returns by $173.00 per acre in comparison to $150.64 in 1982. In addition to production costs increasing in 1983 by 2.9 per cent, market returns dropped by a significant 14.8 per cent during the two-year period.

Table 10

SUMMARY OF COSTS AND RETURNS - 1983 GROUP AVERAGE

	Group Average ($/acre)	Group Average ($/tonne)	Percent of total
Returns			
Sugar Beet Sales	691.75	38.76	98.15
Sugar Beet Top Value	9.20	0.52	1.32
Hauling Allowance	3.82	0.21	0.53
TOTAL RETURNS	704.77	39.49	100.00
Cash costs			
Machine Operation	166.46	9.33	18.97
Materials	153.47	8.60	17.49
Custom/Contract Work	68.56	3.84	7.81
Cash Rent/Crop Share	36.05	2.02	4.11
Hired Wage Labour	15.23	0.85	1.73
Cash Overhead	78.08	4.37	8.89
TOTAL CASH COSTS	517.86	29.01	59.00
Non-cash costs			
Land	74.32	4.16	8.46
Building Ownership	31.26	1.75	3.56
Machinery Ownership	185.13	10.37	21.09
Operator's Wage Labour	69.20	3.88	7.89
TOTAL NON-CASH COSTS	359.91	20.16	41.00
TOTAL PRODUCTION COSTS	877.77	49.17	100.00
Return over cash costs ($/Acre)	186.92	10.47	
Return to management ($/Acre)	-172.99	-9.69	
Break-even price to cover cash costs ($/tonne)	29.01	---	
Break-even price to cover all costs ($/tonne)	49.17	---	

Total production costs for the 1983 crop year amounted to $877.77 per acre or $49.17 per tonne. Of this total, cash costs amounted to $517.86 per acre ($29.01 per tonne) and accounted for 59 per cent. All cash cost items increased in 1983, the most significant of which was seed cost by 82 per cent. It would appear that growers in 1983 substituted their labour for hired labour and custom/contract operations. Also, the item cash rent/crop share increased by 44 per cent as more growers grew beets on rented land versus owned land. As a result, a shift in the cost structure was observed for 1983 as cash costs increased by 10.6 per cent and non-cash costs decreased by 6.7 per cent, relative to 1982. As in previous years, the most significant cash cost facing growers was that of machine operating costs which amounted to $166.46 per acre ($9.33 per tonne) or 32.1 per cent of the total. This was followed by material inputs, namely seed, fertilizer, and chemicals at $153.47 per acre ($8.60 per tonne), thereby accounting for 29.6 per cent of the cash costs.

Just as machine operation cost was the most significant cash cost, machine ownership costs at $185.13 ($10.37 per tonne) represented the largest portion (51.4 per cent) of the non-cash costs. Land and building ownership costs represented 29.4 per cent of the total non-cash costs while operator's labour accounted for the remaining 19.2 per cent. Overall, machine operation together with machinery ownership costs accounted for just over 40 per cent of the total production costs.

As a result of the high yield increase in relation to the increase in production costs in 1983, the break-even price required to cover costs declined. A return of $29.01 per tonne of beets was required in 1983 to cover cash costs as compared to $30.83 in 1982. More important, the break-even price required to cover all production costs in 1983 declined by 14.3 per cent from $56.21 per tonne to $49.17 per tonne.

Presented in Figure 2 is a pie graph showing in some detail the percentage breakdown of the various costs associated with sugar beet production in 1983.

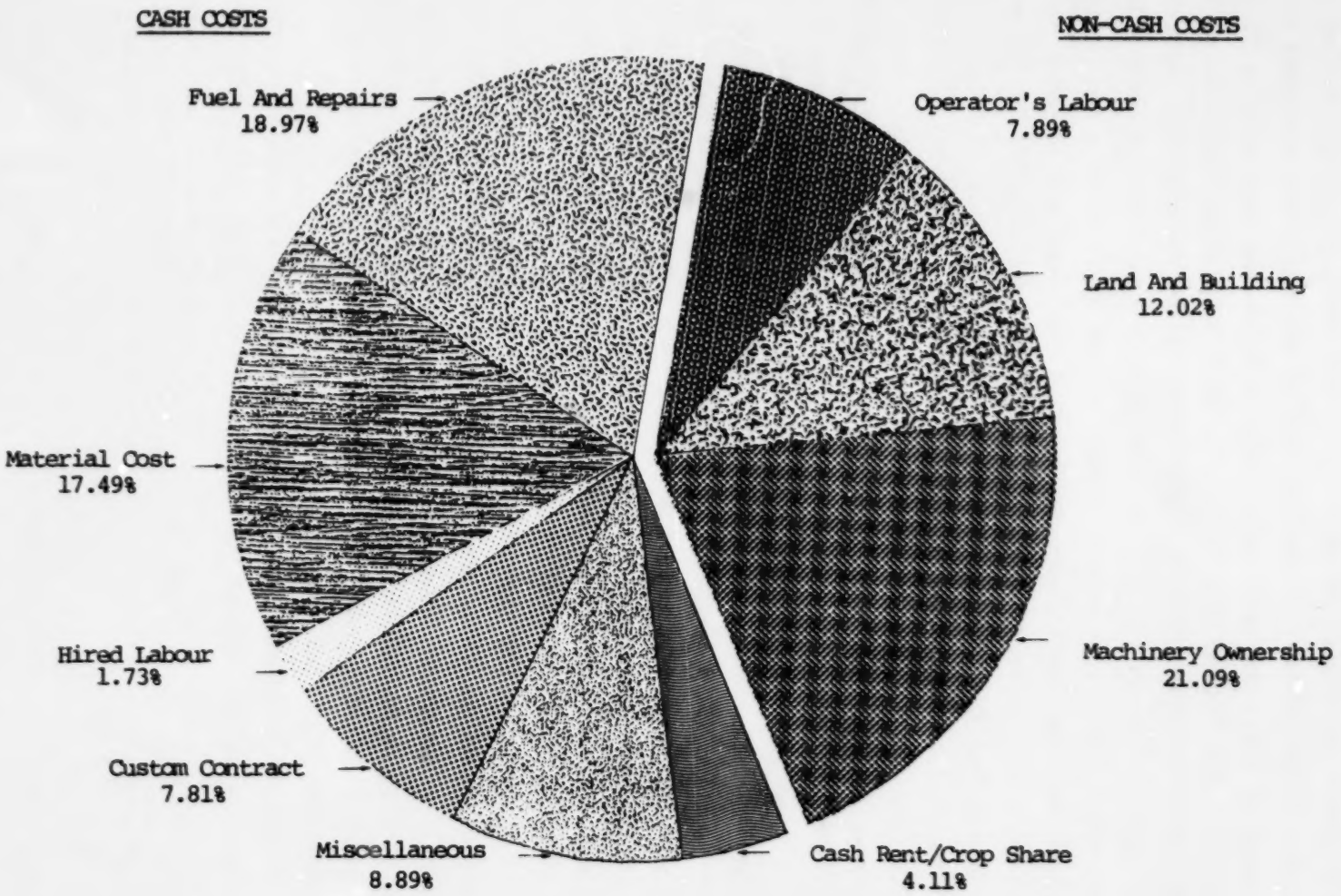


FIGURE 2: PERCENTAGE BREAKDOWN OF 1983 SUGAR BEET COSTS

SECTION III

EFFECT OF SIZE OF OPERATION

In an attempt to evaluate whether the size of an operation had any effect on net returns, study participants were divided into four size categories. Size for each category was determined on the basis of number of planted sugar beet acres and were as follows: less than 40 acres; 40-69 acres; 70-99 acres and 100 acres and over.

A very fundamental economic principle of any production unit is that as the size of that unit is increased, it becomes more efficient in the use of its factors of production. However, this increase in efficiency is not infinite as size increases, but rather there exists a 'certain size' beyond which any further expansion results in an economic disadvantage. In other words, owing to the limitations of the factors of production, the production unit becomes very uneconomical in that the cost of additional units of input does not justify the additional returns generated.

In view of the above, one would expect some degree of cost savings as the size of the sugar beet enterprise is increased. For example, the cost per acre for specialized sugar beet equipment would decline as the number of sugar beet acres is increased. Conversely, this very cost on a per acre basis would increase if expressed on a smaller number of acres.

Similarly, growing sugar beets on larger scale would increase the demand for inputs, equipment, etc. The increase would result into relatively higher costs. However, there are certain cost savings techniques which can reduce the overall expenditures. For example, bulk buying would decrease the unit price charged for a particular input in comparison to that same input being bought in smaller volumes. Also, by operating on a large scale more efficient use is made of labour and management resulting in a further reduction in costs.

The previous two paragraphs are only examples of the types of costs savings that can be realized on larger farms as compared to smaller farms. It should be stressed that the effect of such reductions results in a relatively lower production cost structure and therefore greater returns to management.

Returns from Sugar Beet Production by Size of Operation

Presented in Table 11 are the costs and returns associated with sugar beet production for the four size groups analyzed. As observed, it is difficult to establish a relationship between sugar beet yield (returns) and size for the 1983 study year. The second largest size group (70 to 99 acres) reported the highest yield at 20.53 tonnes per acre, approximately 23 per cent more than the average of the three remaining groups. This same size class also reported the highest yield for the 1981 and 1982 study years. Also in agreement with previous research is the observation that the smaller sugar beet growers were much more inclined to utilize sugar beet tops as compared to their larger counterparts. For example, in 1983 the total value of sugar beet tops for the farms having less than 40.0 acres of sugar beets was $16.08 per acre in comparison to that of $7.40 per acre reported by the sugar beet farms with over 40 acres. One possible explanation for the lower value reported by the larger growers is that larger farms are more inclined to use defoliators in their harvesting operations, resulting in much of the crop residue being incorporated into the soil.

Another observation suggests that hauling allowances increased with the size of operation. The rationale is that the larger sugar beet growers with larger trucks tend to find it more beneficial to haul their sugar beets directly to the Taber factory. The range in hauling allowance on a size basis varied from $1.91 for farms growing less than 40 acres of sugar beets to $6.20 for farms growing 100 acres or more of sugar beets. For the group planting 70 - 99 acres of sugar beets, their hauling allowance was $1.97 per acre. Also, a large percentage of the sugar beets was hauled to the loading stations by growers in this group as their locations were most distant from the Taber factory. This group also reported the highest cost for sugar beet transportation.

The range in total returns varied from $636.26 per acre for the farms planting over 100 acres of sugar beets to a high of $805.22 per acre for those planting 70 - 99 acres.

Table 11

SUMMARY OF COSTS AND RETURNS BY SIZE OF OPERATION - 1983

	GROUP AVERAGE	LESS THAN 40 ACRES	40-69 ACRES	70-99 ACRES	100 ACRES AND OVER
Number of Farms	48	16	10	13	9
Average Yield (t/Ac)	17.85	17.13	16.99	20.53	16.03
			$ Per Acre		
Returns					
Sugar Beet Sales	691.75	663.96	658.53	795.55	621.32
Sugar Beet Tops	9.20	16.08	5.77	7.70	8.74
Hauling Allowance	3.82	1.91	4.83	1.97	6.20
TOTAL RETURNS	704.77	681.95	669.13	805.22	636.26
Cash Costs					
Machine Operation	166.46	199.73	151.78	181.90	140.22
Materials	153.47	129.11	151.41	153.47	168.50
Custom/Contract work	68.56	85.39	68.34	67.31	60.39
Cash Rent/Crop Share	36.05	25.08	.63	55.50	42.63
Hired Wage Labour	15.23	4.31	15.58	10.93	25.60
Cash Overhead	78.08	87.45	84.62	76.39	70.75
TOTAL CASH COSTS	517.86	531.07	472.36	545.50	508.09
Non-Cash Costs					
Land	74.32	71.24	101.09	65.67	69.69
Building Ownership	31.26	42.39	34.72	31.57	22.66
Machinery Ownership	185.13	216.39	176.46	196.90	160.47
Operator's Wage Labour	69.20	118.87	70.10	71.85	37.75
TOTAL NON-CASH COSTS	359.91	448.89	382.36	365.99	290.58
TOTAL PRODUCTION COSTS	877.77	979.71	854.72	911.49	798.67
Return Over Cash Costs	186.91	150.88	196.77	259.72	128.17
Return to Management	-173.00	-297.76	-185.59	-106.27	-162.41
Break-even Yield to cover Cash Costs (t/Ac)	13.12	13.34	11.99	13.91	12.80
Break-even Yield to cover All Costs (t/Ac)	22.23	24.61	21.70	23.24	20.12

Cash Production Costs By Size of Operation

Table 11 also suggests that economies of scale did exist as the size of the sugar beet operation increased. Moreso were the cost savings realized in the area of labour. As shown in this table, total labour cost which includes both hired and owned showed a steady decline as the total sugar beet acres increased. Total labour cost for farms growing less than 40 acres of sugar beets was $123.18 per acre and represented the highest cost for the entire group of sugar beet growers studied. Farms cultivating 100 acres or more of sugar beets reported the lowest labour cost of $63.35 per acre or a decrease of approximately 49.0 per cent between the two size groups. This indicates that as farm size increases there is an associated increase in labour demand. To offset this increase and for economic reasons many sugar beet growers are forced into a situation of substitution whereby an increase in the usage of machinery is made to replace hired labour. In addition, larger farms tend to use more innovative practices such as chemical weed control and mechanical thinning to reduce labour cost.

When machine operating costs were examined the highest cost was observed for the group cultivating less than 40 acres of sugar beets at $199.73 per acre. For the group with 100 acres or more of sugar beets, their machine operating cost was the lowest at $140.22 per acre. Machine ownership costs were $216.39 per acre for those study participants having fewer than 40 acres of sugar beets while those with 100 acres or more had machine ownership costs of $160.47. Essentially, by spreading out the fixed cost of machine ownership over more acres along with the lower time requirements for larger farms with large equipment accounted for the lower machine cost observed.

A few points are worth noting when material input costs are considered (See Table 12). Overall, farms having less than 40 acres of sugar beets had the lowest material input cost. Cost for these farms was significantly low especially for fertilizer at $60.97 per acre. In terms of seed costs, these farms had the second lowest cost at $34.63 per acre when compared to the other three size groups. Moreover, this group despite having the lowest material costs reported the second highest yield at 17.13 tonnes per acre. Although not supported by 1983 data, there seems to exist a trade off between input use (as affected by cost) and yield. How best inputs ought to be used is totally dependent upon the grower's management ability, his financial position, etc.

Table 12

SUMMARY OF MATERIAL INPUT COSTS BY FARM SIZE - 1983

	Less Than 40 Acres	40 - 49 Acres	70 - 99 Acres	100 Acres And Over
			$ /Acre	
Yield (t/Ac)	17.13	16.99	20.53	16.03
Seed	34.63	33.25	40.01	42.69
Fertilizer	60.97	73.63	75.48	75.80
Chemicals	33.51	44.53	37.98	50.01
TOTAL	129.11	151.41	153.47	168.50

Material costs increased consistently with farm size in 1983. One would expect fertilizer expenditures per acre to decline moderately as farm size increases, although not due to a different application rate but rather to the advantages of bulk buying, etc. Chemical costs, however, would be expected to increase as the scale of the operation increased. The rationale being that as the operation gets larger and in an attempt to reduce labour demands, an increased usage of chemicals would be incorporated. The cost of chemicals for the size groups with over 100 acres was $50.01 per acre compared to $33.51 for the group with less than 40 acres.

In general, total cash overhead costs (Table 13) declined with increasing farm size from $87.45 per acre to $70.75 per acre for the smallest (less than 40 acres) and largest (100 acres or more) sugar beet operations, respectively. This decline in cost was most prevalent in the area of building and equipment insurance, which ranged from $10.62 per acre on farms with less than 40 acres of sugar beets to $5.76 per acre on farms having 100 acres or more. A similar trend was also observed for utilities, ranging from $13.71 per acre on farms seeding less than 40 acres of sugar beets to $4.58 per acre on farms seeding 70 - 99 acres. For the size class having 100 acres and more, the average utility cost amounted to $5.94 per acre.

Table 13

SUMMARY OF CASH OVERHEAD COSTS BY SIZE OF SUGAR BEET OPERATION - 1983

	Less Than 40 Acres	40 - 49 Acres	70 - 99 Acres	100 Acres And Over
	----------	$ /Acre	----------	
Crop Insurance	0.00	1.32	0.16	0.00
Association Fees	3.31	3.52	4.11	3.21
Land Tax	4.70	3.56	3.59	3.13
Water Tax	11.66	10.37	8.03	10.91
Building & Equipment Ins.	10.62	9.37	10.36	5.76
Utilities	13.71	9.68	4.58	5.94
Beet Freight	3.46	3.46	5.22	1.99
Miscellaneous Overhead	5.25	12.44	4.64	6.57
Interest on Oper. Capital	34.74	30.90	35.69	33.24
TOTAL CASH OVERHEAD	87.45	84.62	76.39	70.75

Interest on operating capital was the highest for farms with 70 - 99 acres of sugar beets at $35.69 per acre. Overall, interest cost for sugar beet production was quite small ranging from $30.90 per acre on farms with 40 - 69 acres to $35.69 per acre on farms with 70 - 99 acres. The range in total farm overhead costs was from $70.75 per acre for farms with 40 acres and over of sugar beets to $87.45 per acre on farms having less than 40 acres of sugar beets.

Non-Cash Production Costs By Size Of Operation

No economic analysis is complete without taking into account non-cash production costs. The costs that were considered under this heading were primarily that of operator's labour, machine interest and depreciation, building and equipment interest and depreciation, and land interest (Table 14).

As indicated in this table, the advantages associated with size of the sugar beet operation were most obvious in the areas of operator's labour and building and equipment ownership (interest and depreciation). Both of these

Table 14

SUMMARY OF NON-CASH OVERHEAD COST BY SIZE OF SUGAR BEET OPERATION - 1983

	Less Than 40 Acres	40 - 49 Acres	70 - 99 Acres	100 Acres And Over
	----------	$ /Acre	----------	
Operator's Labour	118.87	70.10	71.85	37.75
Machine Int. & Deprec'n	216.39	176.46	196.90	160.47
Building Int. & Deprec'n	42.39	34.72	31.57	22.66
Land Interest (7%)	71.24	101.09	65.67	69.69
TOTAL NON-CASH OVERHEAD	448.89	382.36	365.99	290.58

areas showed a steady decline in cost with increasing farm size. It is apparent that the larger sugar beet operations were able to spread their fixed cost over a larger number of acres thereby resulting in a lower cost per acre in comparison to the smaller sugar beet operations. A lower opportunity cost associated with land ownership for the two larger size groups is as a result of the higher incidence of cash rent/crop share arrangements on larger farms.

Summary Of Costs And Returns By Size Of Operation

In general, total cost per acre in 1983 declined as the size of the sugar beet enterprise increased. This was to be expected as a result of the advantages associated with economies of scale, especially, in the areas of machine use, labour, and non-cash overhead. Based upon the results presented in this section some of the general conclusions that can be drawn are:

1. There was a definite yield difference among the four size classes analyzed. Average yield ranged from 16.03 tonnes per acre for the group with over 100 acres to 20.53 tonnes for the 70 - 99 acre size group.
2. Due to economies of scale, larger sugar beet farms can produce sugar beets at considerably lower cost per acre

(resulting in increasing net returns) when compared to smaller farms.

3. The 70 - 99 acre size group had relatively high cash costs due in part to the additional machine expenses incurred in harvesting the high yielding crop and also the high cash rent/crop share expense reported for this group. Nonetheless, this group reported the highest return over cash costs.
4. Hired labour becomes more important as farm size increases and ranged from $4.31 per acre on farms with less than 40 acres to $25.60 per acre for farms with over 100 acres. However, the cost for hired and operator labour was 49 per cent lower on farms with 100 acres and over in comparison to the farms with less than 40 acres.
5. The total realized return for the 1983 sugar beet crop was $39.48 per tonne (includes hauling allowance and beet top values). Break-even prices per tonne required to cover total production costs were $57.19, $50.31, $44.40 and $49.82 for the less than 40 acres, 40 - 69 acres, 70 - 99 acres and 100 or more acre size groups, respectively.

SECTION IV

EFFECT OF LOCATION

In order to analyze the economics of sugar beet production by location within the sugar beet growing area of Southern Alberta, the 48 records obtained were divided into three main areas, namely, Lethbridge, Taber and Vauxhall.

For the Lethbridge area a total of 14 sugar beet enterprises were analyzed. More specifically, the participants involved were from Coaldale, Lethbridge and Tempest. The Taber area included Taber, Bow Island and Barnwell and involved a total of 20 sugar beet enterprises. Included in the Vauxhall area were Picture Butte, Vauxhall and Turin from which a total of 14 sugar beet enterprises were studied.

Returns From Sugar Beet Production By Location - 1983

It is evident that the returns from any given crop is directly related to its yield. Sugar beet exhibited variation in returns as the crop location changed. Table 15 attempts to show the associated yield, costs and returns of the sugar beet crop for different locations.

As indicated in Table 15, sugar beet yields were highest in the Vauxhall area averaging 19.45 tonnes per acre or 12 per cent above the average yield for the Lethbridge and Taber areas. This range in yield as observed among the three locations represented an actual dollar difference in returns of $88.76 per acre.

Returns from the feeding/sale of sugar beet tops were also found to be quite varied as Taber and Lethbridge growers utilized a larger portion of the crop residue for livestock feeding. For these study participants an average return from the sale/feed value of sugar beet tops of $10.85 per acre was observed. For the Vauxhall growers an average sugar beet top sale of $3.93 per acre was reported.

Additional returns that were realized through the hauling of sugar beets ranged from $2.88 per acre in the Vauxhall area to $4.88 per acre in the Lethbridge area. Referring to the data obtained during the 1981-83 research period, larger quantities of sugar beets were hauled directly to the factory when yields were below average. Lower yields translate into a

Table 15

SUMMARY OF COSTS AND RETURNS FOR SUGAR BEET PRODUCTION BY LOCATION - 1983

LOCATION	LETHBRIDGE AREA		TABER AREA		VAUXHALL AREA	
Acres on Farm	59.42		51.05		45.49	
Number of Farms	14		20		14	
Yield (t/Ac)	17.46		17.16		19.45	
			$ /Acre			
Returns						
Sugar Beet Sales	676.75		665.12		753.88	
Sugar Beet Tops	9.27		12.42		3.93	
Hauling Allowance	4.88		3.54		2.88	
TOTAL RETURNS	690.90	39.57/t	681.08	39.69/t	760.69	39.11/t
Cash Costs						
Labour (Hired)	19.12		13.51		12.91	
Contract Work	67.61		60.87		82.14	
Materials	175.45		142.37		142.57	
Machine	172.12		161.12		167.65	
Miscellaneous	111.06		105.23		132.40	
TOTAL CASH	545.36	31.23/t	483.10	28.15/t	537.67	27.64/t
Non-Cash Costs						
Land	87.54		74.11		57.38	
Buildings	26.50		35.72		30.33	
Machinery	200.59		176.96		178.04	
Operator's Labour	61.02		71.71		75.85	
TOTAL NON-CASH	375.65	21.51/t	358.50	20.89/t	341.60	17.56/t
TOTAL COSTS	921.01	52.75/t	841.61	49.04/t	879.28	45.21/t
Return over cash costs	145.54	8.34/t	197.98	11.54/t	223.02	11.47/t
Return to Management	-230.11	-13.18/t	-160.53	-9.35/t	-118.59	-6.10/t
Break-even yield to cover cash costs	13.78		12.17		13.75	
Break-even yield to cover all costs (t/Ac)	23.28		21.20		22.48	

longer loading time thereby enabling other trucks in the loading fleet to travel greater distances.

Cash Production Costs By Location

A detailed breakdown of cash costs associated with sugar beet production among the three main sugar beet producing areas is shown in Table 16.

Table 16

A BREAKDOWN OF SUGAR BEET CASH COSTS BY LOCATION - 1982

CASH COSTS	LETHBRIDGE AREA		TABER AREA		VAUXHALL AREA	
	----------		$ /Acre		----------	
Labour (hired)	19.12		13.51		12.91	
Custom/Contract	67.61		60.87		82.14	
Fertilizer	83.87		63.13		73.18	
Seed	43.40		40.48		29.62	
Chemicals	48.20		38.76		39.77	
Machine Operations	172.12		161.12		167.65	
Cash Rent/Crop Share	26.32		31.87		55.47	
Crop Insurance	0.00		0.00		1.13	
Association Fees	3.56		3.43		3.81	
Land Tax	4.81		3.70		2.03	
Water Tax	12.09		10.15		7.10	
Bldg. & Equip. Ins.	8.28		8.92		9.15	
Utilities	8.10		7.31		7.33	
Beet Freight	2.97		2.67		5.75	
Miscellaneous	9.24		5.56		5.44	
Int. on Oper. Capital	35.68		31.60		35.17	
TOTAL	545.36	31.24/t	483.10	28.15/t	537.67	27.64/t

Total cash costs were observed to be the highest in the Lethbridge area at $545.36 per acre, followed by Vauxhall at $537.67 and then by Taber at $483.10 per acre. These costs, when expressed on a per tonne basis, amounted to $31.24, $27.64 and $28.15 for the three above mentioned areas, respectively.

Consistent with the previous study years (1981 and 1982), material inputs, namely seed, fertilizer and chemicals in 1983 were the highest

in the Lethbridge area at $175.47 per acre. This was approximately 23 per cent higher than the $142.57 reported for the Vauxhall area and $142.37 for the Taber area. One of the main reasons for such high material costs for the Lethbridge area was largely due to the re-seeding of part of the sugar beet crop following the May 12th freeze.

Machine operating costs were found to be the highest for the Lethbridge area at $172.12 per acre. This was followed by Vauxhall at $167.65 per acre and then by Taber at $161.12 per acre. Such high costs for the Lethbridge area can be partially attributed to the heavy textured soil which has high horsepower requirements. Secondly, the Lethbridge growers reported hauling more of their sugar beets directly to the Taber factory hence incurring the highest machine operating costs that were only partially off-set by the hauling allowances received.

Cash rent/crop share costs for the Vauxhall area were significantly high when compared to the other two locations. The implication of this being that a smaller portion of the cropped sugar beet acres were grown on owned land. Cash rent/crop share for the Vauxhall area was $55.47 per acre while in the Taber area a total cost of $31.87 per acre was reported. The lowest cost of $26.32 per acre for cash rent/crop share in the Lethbridge area indicates that a higher percentage of the sugar beet acreage on study was owned.

The Lethbridge area growers had the highest average acreage of the three locations studied. As such, they realized cost savings in the areas of operator and family labour, insurance and building ownership. Their higher requirements for hired labour is reflected by the higher cost of $19.12 per acre as compared to $13.51 for Taber and $12.91 for Vauxhall. As well, they reported the highest land and water taxes at $16.90 per acre suggesting high land assessment and relatively higher water rates. Vauxhall growers showed the lowest water rates at $7.10 per acre in 1983.

The highest cash costs for custom/contract work and cash rent/crop share was reported by the Vauxhall growers. It was observed that these growers with their relatively high yield utilized more custom hiring during the harvesting season especially in the trucking of sugar beets.

Non-Cash Production Costs By Location

Components of total non-cash production costs for the three locations studied are shown in Table 17.

Table 17

SUMMARY OF NON-CASH PRODUCTION COSTS FOR SUGAR BEETS
BY LOCATION - 1983

	LETHBRIDGE AND AREA	TABER AND AREA	VAUXHALL AND AREA
		$/Acre	
Operator's Labour	61.02	71.71	75.85
Machinery Interest & Depreciation	200.59	176.96	178.04
Building Interest & Depreciation	26.50	35.72	30.33
Land Interest	87.54	74.11	57.38
TOTAL NON-CASH COST	375.65	358.50	341.60

Consistent with the findings of the 1981 and 1982 study years, higher labour costs were still being noted for the Vauxhall and Taber areas at $75.85 per acre and $71.71 per acre, respectively. For the Lethbridge area, this value was much lower at $61.02 per acre. This observed reduction in labour cost for the Lethbridge area might suggest that because of the size of the sugar beet farms (which are predominantly large), the trend has shifted towards increased mechanization as a substitute for higher labour demands.

As for land costs, there existed a direct relationship between land ownership costs and the proportion of sugar beets grown on owned land. For example, as was shown in the cash cost section, the Lethbridge sugar beet growers had the lowest cash rent/crop share costs and therefore had the highest owned land cost of $87.54 per acre. For the study participants from the Taber and Vauxhall areas, relatively lower land costs of $74.11 per acre and $57.38 per acre were observed implying that these growers grew a greater proportion of their sugar beets on rented land.

Machinery interest and depreciation costs ranged from $176.96 per acre in the Taber area to $200.59 per acre for the Lethbridge area, while the Vauxhall area reported a cost of $178.04 per acre. The total non-cash costs on a per acre basis ranged from $341.60 in the Vauxhall area to $375.65 in the Lethbridge area.

Summary Of Costs And Returns By Location

Findings from the 1983 sugar beet study by location differ from those reported in the previous study years - 1981 and 1982. An attempt has been made to highlight a few of the major findings and are as follows:

1. Study participants from the Taber area experienced considerably lower cash costs of $483.10 per acre in comparison to those from Vauxhall and Lethbridge which reported cash costs of $537.67 per acre and $545.36 per acre, respectively.
2. In contrast to the study results for 1981 and 1982 in which the Lethbridge area reported the highest yields, Vauxhall growers in 1983 out-yielded the other areas by more than 2 tonnes per acre.
3. Although the Vauxhall area reported relatively higher cash costs, their non-cash costs were the lowest. This, coupled with their high yield gave them the lowest cost of production per tonne of sugar beets produced.
4. Returns among the three main sugar beet producing areas were quite similar and ranged from $39.11 per tonne in the Vauxhall area to $39.69 per tonne in the Taber area. Average returns for the Lethbridge area were reported at $39.57 per tonne.
5. Total production costs ranged from $45.21 per tonne in the Vauxhall area to $52.75 per tonne in the Lethbridge area. For the Taber area, this cost amounted to $49.04 per tonne.
6. Study participants in the Lethbridge area were short $13.18 per tonne in covering all of their production costs while in the Taber and Vauxhall areas they were short $9.35 per tonne and $6.10 per tonne, respectively.
7. The break-even yield, in tonnes per acre, required to cover total production costs for the Lethbridge, Taber and Vauxhall areas were 23.28, 21.20 and 22.48 respectively.

SECTION V

SUMMARY OF COSTS AND RETURNS FOR 1981-1983

A summary of costs and returns for sugar beet production in Southern Alberta is presented in Table 18 for the three study years (1981-1983). Due to the adverse weather (hail, rain, wind erosion) especially in 1982, yields fluctuated by over 20 per cent ranging from 15.56 to 20.39 tonnes per acre during the three year period. As observed, yields have more or less increased with time due to a number of management/technological factors which growers have been adopting. These include the reduction of summerfallow, an increase in the use of herbicides/insecticides, as well as the use of monogerm seed. The three year average yield for the period 1981-1983 was 18.0 tonnes per acre compared to that of 15.41 tonnes per acre for 1978-1980.

Alberta sugar prices have fluctuated in line with the world prices from $32.52 to $74.05 per tonne during the last decade. Since 1979, world sugar prices have weakened and returns to growers have declined to $38.76 per tonne for the 1983 crop. Sugar beet growers do have some price protection during periods of low prices and are expected to receive a support price with respect to the 1983 crop. Under the National Agricultural Products Stabilization Act, support payments of $4.69 per tonne and $10.06 per tonne were made to growers for the 1981 and 1982 crop years, respectively. Returns from sugar beet sales declined from $822.58 per acre in 1981 to approximately $691.00 per acre in 1982 and 1983. Income from hauling allowance and beet tops represents less than 2 per cent of the overall returns.

Generally speaking, cash costs increased over the 1981-1983 study period from $498.73 per acre in 1981 to $517.86 per acre in 1983. However, the 1982 cash cost decreased from 1981 levels due to lower harvesting costs associated with the smaller crop as well as less summerfallowing. As a note of interest, 13 sugar beet growers studied in 1981 were grown on summerfallow as compared to one in 1982; in 1983 all study participants grew sugar beets on stubble land. Higher costs for seed, chemicals, cash rent/crop share, custom work, and machine operation led to the significant increase in cash costs in 1983 over 1982. With returns decreasing by 15.5 per cent and

cash costs increasing by 3.8 per cent, returns over cash costs decreased from $334.81 per acre in 1981 to $186.92 per acre in 1983.

Non-cash costs decreased continuously during the 1981-1983 study period, from $394.27 per acre in 1981 to $359.91 per acre in 1983. Opportunity interest costs on land ownership declined as a result of less summerfallowing and more cash rent/crop share. Higher machine ownership costs were observed for 1983 and these relate to the planting operation because of extensive re-seeding. As well, higher trucking costs were incurred in the hauling of sugar beets in 1983. The non-cash costs of sugar beets declined to $20.16 per tonne in 1983 from $25.38 per tonne in 1982.

Total production costs incurred in sugar beet production increased by less than two per cent during the 1981-1983 period. Returns from sugar beet sales, however, decreased by 15.4 per cent and had the net effect of increasing grower losses to $173.00 per acre in 1983 as compared to $59.45 per acre in 1981.

Table 18

COMPARISON OF COSTS AND RETURNS FOR THE
1981 - 1983 STUDY YEARS

	1981 Group Average	1982 Group Average	1983 Group Average	3 Year Average
Returns				
Average Yield (t/Ac)	19.05	15.18	17.85	17.36
		$ /Acre		
Sugar Beet Sales	822.58	690.97	691.75	735.10
Sugar Beet Top Value	7.09	6.45	9.20	7.58
Hauling Allowance	3.87	5.22	3.82	4.30
TOTAL RETURNS	833.54	702.64	704.77	746.98
Cash Costs				
Machine Operation	161.52	160.63	166.46	162.87
Seed	18.57	21.25	38.68	26.17
Fertilizer	73.05	74.96	72.63	73.55
Chemicals	31.70	37.55	42.16	37.14
Wage Labour	27.84	14.29	15.23	19.12
Custom/Contract Work	67.97	59.97	68.56	65.50
Cash Rent/Crop Share	36.89	25.01	36.05	32.65
Land/Water Taxes	11.33	13.07	13.66	12.69
Interest on Oper. Capital	41.18	30.62	33.88	35.23
Misc. Cash Overhead	28.67	30.71	30.55	29.98
TOTAL CASH COSTS	498.73	468.06	517.86	494.90
Non-Cash Costs				
Land	82.76	94.88	74.32	83.99
Building Ownership	38.56	33.27	31.26	34.36
Machinery Ownership	195.80	175.62	185.13	185.52
Operator's Wage Labour	77.15	81.46	69.20	75.94
TOTAL NON-CASH COSTS	394.27	385.23	359.91	379.80
TOTAL PRODUCTION COSTS	892.99	853.28	877.77	874.68
Return Over Cash Costs	334.81	234.58	186.91	252.10
Return to Management	-59.45	-150.64	-173.00	-127.70
Break-even Price to cover Cash Costs ($/Tonne)	26.18	30.83	29.01	28.51
Break-even Price to cover All Costs ($/Tonne)	46.88	56.21	49.17	50.38

Summary

The main conclusions drawn from the 1981-1983 sugar beet cost of production study are as follows:

1. Sugar beet production is generally considered as one of the main cash crops for farmers in the irrigated areas of Southern Alberta;

2. During the three year study period, growers harvested a record yielding crop in 1981, a rather disappointing crop in 1982, and an average crop in 1983. The three year average was 17.36 tonnes per acre for the study participants;

3. With sugar beet yields increasing in the last five years as a result of new technology and per capita sugar consumption decreasing more readily than population growth, the sugar beet acreage is expected to remain rather constant if not decrease in the near future;

4. As returns to Alberta sugar beet growers are directly related to world sugar prices which are projected to remain low over the next five years, grower returns are not expected to improve in the near future;

5. Production costs have continued to increase marginally in recent years, however, returns have decreased significantly averaging 8.0 per cent per year in the last five year period;

6. Field research with growers supports the theory of economies of scale mainly resulting from the use of specialized equipment in sugar beet production. A downward trend in contracted acreage implies a lower acreage per farm which translates to higher costs of production per unit of output;

7. The most significant costs in sugar beet production are machinery operating and machinery ownership costs which when

combined accounts for 40 per cent of the total production costs;

8. On the basis of average yields realized in the 1983 study, a break-even price of $49.17 per tonne was required to cover all costs. The break-even prices for sugar beets for the four size groups were as follows:

Group 1	1 - 39 Acres	$57.19/Tonne
Group 2	40 - 69 Acres	$50.31/Tonne
Group 3	70 - 99 Acres	$44.40/Tonne
Group 4	Over 100 Acres	$49.82/Tonne

9. Through the adoption of new technology, especially in relation to chemical use, sugar beets are now mainly grown on stubble land. As a note of interest, 13 of the 50 participating farms in 1981 grew beets on summerfallowed land while in 1983 there was none.

10. Only five of the farms on study in 1983 had positive returns to management. Their yields were relatively high, ranging from 20.13 tonnes per acre to 23.64 tonnes per acre;

11. The following is an indication as to the variations in yields and costs of production for the 48 farms participating in the 1983 study.

	Group Average	Range
Yield (tonnes/acre)	17.85	10.22 to 23.64
		$/Acre
Cash Cost	517.86	358.93 to 782.84
Total Cost	877.77	661.06 to 1,399.07
		$/Tonne
Return Over Cash Cost	10.47	-8.08 to 23.69
Return to Management	-9.69	-72.93 to 6.84

12. During the 1981-1983 study period, the break-even price to cover cash costs ranged from $26.18 per tonne in 1981 to $30.83 per tonne in 1982. The break-even price to cover all costs ranged from $46.88 per tonne in 1981 to $56.21 per tonne in 1982.